**ITEM # ___26__**
**DATE: 07-08-14**

## COUNCIL ACTION FORM

**SUBJECT: ENGINEERING SERVICES AGREEMENT CHANGE ORDER FOR DESIGN OF NEW WATER TREATMENT PLANT**

**BACKGROUND:**

Informal reviews with the Iowa Department of Natural Resources (IDNR) of the design for the new Water Treatment Plant took place throughout calendar year 2013. The preliminary designs shared with the IDNR included the use of external (i.e. installed outdoors) cascade aerators. This style of aerator is currently in use at the existing Water Plant. Based on a life-cycle cost analysis, staff recommended its use in lieu of more efficient but more expensive forced draft aerators at the new facility.


Cascade aerators at existing Water Treatment Plant

In April of 2014 the completed final design for the new Water Treatment Plant was submitted to the IDNR for review and issuance of a construction permit. **During their review, staff from IDNR informed City staff that the use of external cascade aerators would not be permitted based on concerns that it posed an unacceptable potential for contamination of the water.**

The design standards for water systems that have been adopted by the IDNR are contained in the document "Recommended Standards for Water Works," frequently referred to as the "Ten States Standards." Part 4.5 of that document describes the considerations for aeration equipment. Five styles of aerators are explicitly allowed: Natural Draft Aeration, Forced or Induced Draft Aeration, Spray Aeration, Pressure Aeration, and Packed Tower Aeration. The cascade aerators preferred by City staff are not specifically included in the design standard. However, the standard does include the following (emphasis added):

> *4.5.6 Other methods of aeration*
> *Other methods of aeration may be used if applicable to the treatment needs. Such methods include but are not restricted to spraying, diffused air, **cascades**, and mechanical aeration. The treatment process must be designed to meet the particular needs of the water to be treated and are subject to the approval of the reviewing authority.*

IDNR staff has indicated that they are concerned about the potential for contamination, and report that they have not allowed the installation of external cascade aerators for groundwater systems in Iowa for more than 40 years. It should be noted that the existing external cascade aerators used in Ames were installed in 1971. Ames staff pointed out to IDNR the next two paragraphs from the Ten States Standards (emphasis added):

> *4.5.7 Protection of aerators*
> *All aerators **except those discharging to lime softening or clarification plants** shall be protected from contamination by birds, insects, wind borne debris, rainfall and water draining off the exterior of the aerator.*
>
> *4.5.8 Disinfection*
> ***Groundwater supplies** exposed to the atmosphere by aeration must receive **chlorination** as the minimum additional treatment.*

Staff asked IDNR why they were uncomfortable allowing the use of external cascade aerators for Ames, given that Ames is a lime softening groundwater system that chlorinates, and that the Ten States Standards appear to contemplate such a design and in fact includes applicable standards to allow them. IDNR's position was that to allow their use would be inconsistent with their previous practices, and to point to the last clause in Ten States Standard paragraph 4.5.6 that says the use of 'other methods of aeration' is solely at their discretion. IDNR did offer two alternatives to the City.

- **The first alternative would be for Ames to agree to change its classification from being a "groundwater" system to being a "surface water" system.** This would impose additional regular process monitoring, which is not a significant cost or operational issue. However, it would require that a much more restrictive disinfection standard be met. That alternative would require piping modifications and baffling of the existing finished water storage tanks and/or a substantial increase in on-site finished water storage in order to meet the criteria for disinfection that applies to surface water systems. It could also preclude the ability to cost-effectively pump treated drinking water directly from the new treatment plant to the distribution system. Staff believes reclassifying to a surface water system is an unacceptable option for the long-term operation of the treatment facility.

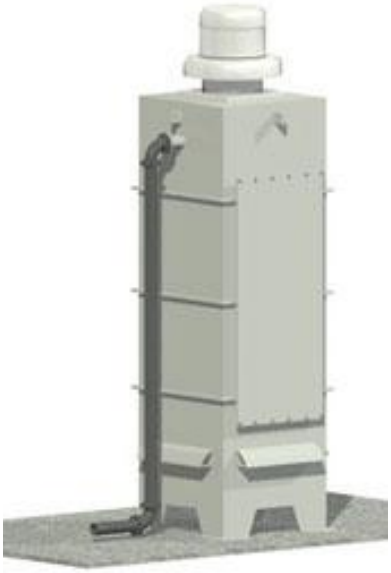
- **The second alternative offered by the IDNR was for the City to enclose the cascade aerators.** The City's consultants have indicated that enclosing the aerators in a pre-cast concrete room would cost approximately $250,000 in increased construction costs, plus an additional design fee to the consultants to redesign the concrete platform and add the necessary electrical and ventilation equipment. This option would result in the new room becoming an OSHA "confined space," would increase the operational expense due to the additional heating and ventilation requirements, and would create an atmosphere that would lead to shortened life for equipment and structural components. The

increased energy demand would likely reduce the LEED credits the project could obtain, which is important because the City is pursuing a LEED Certified facility in order to receive approximately $6 million of forgivable loan proceeds.

Staff has identified the following two additional options to be considered:

- **A third alternative available to the City would be to change from using cascade aerators to using an induced (mechanical) draft aerator.** The IDNR has routinely approved the use of external induced draft aerators for groundwater systems, and staff believes the change would be acceptable to the IDNR. The City's consultants have indicated that making this switch would increase the construction cost by approximately $400,000, and would necessitate an additional $107,780 in redesign fees. It would also delay the issuance of a Notice to Bidders by approximately four weeks. On the plus side, it would generate some very modest operational efficiencies; but these would have an extended payback period of 20 years or more.

- **A fourth alternative available would be to pursue an appeal of the IDNR staff's decision to disallow external cascade aerators.** While City staff understands the desire of the IDNR to error on the side of caution, the marginal increase in protection from contamination seems entirely out of proportion with the increased cost. Further, the unwillingness by IDNR to consider the use of a treatment technique that appears to clearly be contemplated and planned for in the Ten States Standards could be construed as an abuse of the IDNR's administrative discretion. The City's Legal Department has confirmed that the proper first step in filing an appeal would be in front of an administrative law judge with the Iowa Department of Inspections and Appeals. Based on the City's experience with previous such appeals, the likely timeframe for resolution would be on the order of nine to twelve months. During that period, the project could not move forward with bidding or construction. **Using the Consumer Price Index as an approximation of inflation, the cost to the project for delaying construction is estimated at more than $125,000 per month.** As a result, while this option could grant the relief that staff believes is appropriate, it also comes with the greatest cost to the project with no guarantee of a successful outcome. Based purely on the cost of the delay, staff is recommending against this option.



Drawing of a common induced Draft aerator.

Even though two separate discussions had failed to result in the IDNR's willingness to allow the external cascade aerators, staff believed one additional attempt was needed to see if there was any possibility of

providing additional information to the IDNR that would allow them to be comfortable with accepting the conditions described in Ten States Standards paragraphs 4.5.7 and 4.5.8. **Staff has arranged an in-person meeting with staff from the IDNR's Water Supply Engineering Division for Thursday, July 3. The results of that meeting were not known at the time this Council Action Form was finalized. Staff will share the outcome of that meeting at the July 8 City Council meeting.**

**Staff is recommending what is described above as the third alternative – switching the basis of design from cascade aerators to induced draft aerators. To make this change will require a change order to the existing agreement with FOX Engineering.**

On October 13, 2009, Council approved a professional services agreement with FOX Engineering of Ames, Iowa for design work related to the new Water Treatment Plant. The contract consists of a "master agreement" that contains all of the legal terms and conditions, and a series of "task orders" that describe the specific scope of work and associated fees. The use of "task orders" allows the engineering work to be authorized in segments as the project progresses.

On August 28, 2012, Council authorized a series of task orders associated with the final design, bidding, construction, and start-up of the new facility. These task orders were for a combined total of $8,240,000. Change Order No. 1 in the amount of $529,745 was authorized by Council on August 27, 2013 to undertake the revisions recommended by the Value Engineering review. Change Order No. 2 in the amount of $15,400 was authorized by staff on January 14, 2014 to add additional tree removal and modifications to the entrance drive at the lime ponds. Change Order No. 3 in the amount of $7,500 was authorized by staff on March 14, 2014 to add additional stormwater quality features to the site design.

FOX Engineering has prepared an amended scope of work to complete the redesign of the induced draft aerators and incorporate it into the already completed plans and specifications. This changed scope includes a fixed fee of $107,780. Staff is recommending this change order to allow the redesign work to begin immediately in an effort to save at least a portion of the 2014 construction season.

**Should the final discussion with IDNR scheduled for Thursday, July 3 bring a resolution or offer any additional attractive alternative, staff may present new or modified recommendations at the July 8 City Council meeting.**

**ALTERNATIVES:**

1. Authorize Change Order No. 4 to the existing Master Agreement between the City of Ames and FOX Engineering to redesign the aeration process for the new Water Treatment Plant in a fixed fee amount of $107,780.

2. Direct staff to put any redesign effort on hold and pursue a formal appeal of the IDNR staff decision through the Iowa Department of Inspections and Appeals. This alternative would delay by several months the Notice to Bidders with an estimated inflationary cost in the bid prices of $125,000 per month. There is no guarantee that the City would prevail in the appeal, and a redesign to induced draft aerators could still be necessary.

3. Direct staff to pursue another alternative.

**MANAGER'S RECOMMENDED ACTION:**

City staff believes that the existing design of the aeration process provided by FOX Engineering appropriately meets the requirements of the State's adopted design standards contained in the Ten States Standards, and that the IDNR staff's decision to not allow the use of external cascade aerators was made without adequate justification. City staff believes it has exhausted all options for an informal, negotiated resolution with IDNR staff. Pursuing a formal appeal through the Iowa Department of Inspections and Appeals, however, could lead to a delay of up to a year in soliciting bids for the project, resulting in additional inflationary increases in the bids ultimately received.

While staff strongly disagrees with the IDNR's interpretation of the Ten States Standards, staff also recognizes the significant cost impact that would occur from a protracted appeal. For that reason, staff believes that the option to convert the design from external cascade aerators to induced draft aerators is the most responsible alternative from both a cost and operational impact perspective.

**Therefore, it is the recommendation of the City Manager that the City Council adopt Alternative No. 1, thereby approving Change Order No. 4 with FOX Engineering for the design, bidding, and construction of the new water treatment plant in an additional fixed fee amount of $107,780.**